

REMARKS

The Office Action mailed on July 16, 2003 is acknowledged. Applicants request reexamination of the above-mentioned application in view of the remarks which follow.

The Examiner rejects claim 1 under 35 U.S.C. § 103(a) as being unpatentable over Oshima (U.S. Patent 5,747,875) in view of Kaindl (EP 0751570). Specifically, the Examiner asserts that Oshima teaches a device comprising a power part including electronic power components arranged over a power substrate mounted on a cooling plate, and a logic part arranged on a circuit board having a recess inside of which the power part is located. The Examiner also contends that the logic part is electrically connected to the power part via wire bonding techniques, and the circuit board includes a first portion surrounding the power substrate. The first portion is also mounted to the cooling plate. The Examiner does admit that Oshima does not teach a second portion of the circuit board supporting at least one logic component that is not mounted to the cooling plate.

The Examiner also asserts that Kaindl discloses an intelligent power module having a first circuit board portion and a second circuit board portion with the second circuit board portion supporting a logic component. The second portion is also not mounted to the cooling plate. Consequently, the Examiner believes it would have been obvious to one of ordinary skill in the art to separate the first and second portions of Kaindl, and combine the second portion with the module assembly as taught by Oshima, for the purpose of efficiently transferring heat from the power elements to the cooling plate. Applicants respectfully disagree with the Examiner and believe that the teachings of Kaindl when combined with Oshima do not render obvious the limitations of claim 1.

Claim 1 claims a power module including a power part and a logic part. The components of the power part are arranged on a power substrate mounted upon a cooling plate. The components of the logic part are similarly arranged on a circuit board, which includes a recess and is divided into two portions. The first portion of the circuit board is mounted to the cooling plate while the second portion is not mounted to the cooling plate. The Examiner is incorrect in the belief that a combination of Oshima and Kaindl teach this invention.

Oshima, in the embodiment of the invention illustrated in Figure 9, teaches locating the power part within a recess of the circuit board carrying the logic parts. Oshima also teaches mounting the entire power module, including the entire power part and the *entire logic part (with all of the logic components)* to a cooling plate. Conversely, Kaindl teaches mounting only the power part to the cooling plate, while leaving *all of the logic components* free of the cooling plate. Accordingly, a combination of the teachings of Kaindl and Oshima would lead to a power module having the power part, located within a recess of the circuit board carrying the logic parts, with *only* the power part being mounted to the cooling plate. Neither Oshima nor Kaindl suggest mounting one portion of the logic components to the cooling plate, while also keeping free from the cooling plate the remainder.

The two embodiments of the present invention, depicted in Figures 1-2 and 3-4, respectively, demonstrate an advantage of the present invention, not shown in either prior art reference. The power module may be attached to a separate circuit board, as demonstrated in Figures 1 and 2, or folded over along a connecting layer of the circuit board, in a manner of saving space. Each of these configurations is made possible by the arrangement of the logic components on the circuit board, with a fraction of the components arranged on the portion of the circuit board mounted to the cooling plate, and the remainder of the logic components arranged on the portion of the circuit board that is free of the cooling plate. Again, Oshima teaches mounting all of the logic parts to the cooling plate, while Kaindl teaches mounting none of the logic parts to the cooling plate. Neither discloses this feature.

The M.P.E.P. states that when applying 35 U.S.C. 103, certain tenets of patent law must be adhered to, including the tenet that references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination. (See M.P.E.P. page 2100-14). Thus, when combining Oshima and Kaindl, the Examiner must consider both references, as a whole. Therefore, the Examiner must consider that although Oshima discloses a circuit board with a recess, Kaindl does not. Rather, in Kaindl the power substrate is mounted to the circuit board, as evidenced by Figure 1. Thus, not only do Oshima and Kaindl differ in the placement of the logic components with respect to the cooling plate but each differs with respect to the design of the circuit board. Kaindl

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actually teaches a circuit board that does not include a recess and focuses on the power component being mounted to the circuit board, rather than directly to the cooling plate. This differs from both the present invention and Oshima. When considering this teaching, Kaindl is not easily combinable with Oshima.

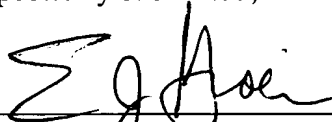
In addition, neither Kaindl nor Oshima provide any suggestion for the combination taught by the present invention. Kaindl is specifically directed toward a module in which the heat sink is aligned with the areas of the power substrate carrying the power components. Additionally, Oshima does not provide any suggestion with regards to limiting the placement of the heat sink to specific areas of the module. Moreover, neither Kaindl nor Oshima discuss dividing the circuit board, and the logic parts mounted thereto, into a first portion and a second portion. Rather, the Examiner relies on the present invention to provide the teachings to combine the references. As such, the Examiner has engaged in the use of impermissible hindsight based only on Applicants' disclosure. As expressed by the U.S. Supreme Court, there is a need "to guard against slipping in hindsight." *Graham v. John Deere Co.*, 383 U.S. 1, 36, 148 USPQ 459, 474 (1965). Should the Examiner disagree, Applicants request that the Examiner provide specific teachings and motivation in the references for combining the references as suggested by the Examiner, as required by M.P.E.P. § 2143.

Accordingly, Kaindl and Oshima do not teach the present invention and are being combined by the Examiner with impermissible hindsight. Therefore, the applicants assert that claim 1 is in condition for allowance. Additionally, since claims 2-6 depend from claim 1, applicants believe each of these claims are also in condition for allowance.

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For all the foregoing amendments and remarks, Applicants believe that all of the pending claims are now in condition for allowance, and respectfully request early passage thereof. If necessary to effect a timely response, please consider this paper a request for an extension of time, and charge any shortages in fees, or apply any overpayment credits, to Baker & Daniels' Deposit Account No. 02-0387 (72262.90020). However, please do not include the payment of issue fees.

Respectfully submitted,

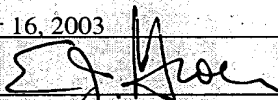


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October 16, 2003

Date



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